The Madras Agricultural Journal

Vol. XXXIX JANUARY 1952 No. 1

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Editorial

It is one of the unexplained mysteries of Agriculture why certain crops are confined to certain localities, even though very similar conditions of soil, climate and rainfall might exist in a number of other places also. For example, jute is confined to Bengal and pepper to the Malabar coast, although it is obvious that conditions very closely similar do exist in other places in the Indian Union where these crops can be expected to thrive. Similar is the case of the eucalyptus tree, for which the main centre in South India is now the Nilgiris; and in the case of potatoes too, the chief centre in South India is at present only the Nilgiris, although almost all the requirements as regards soil, temperature, rainfall and altitude for the successful cultivation of this crop do exist in a number of other places in South India, such as the Kodaikanal Hills in Madura district and the Shevaroys in Salem district.

We publish in this issue an interesting article on the possibilities for extending potato cultivation in the Kodaikanals. In view of the prevailing need for increasing food production and the almost universal popularity of the potato as an article of food, the possibilities of extending its area to a larger extent deserve the fullest consideration by all those who are interested in agriculture.

Another article of interest to agriculturists is the one on the cultivation of bananas as a leaf crop in the Tanjore district, while the note by Dr. Siddappa on canning mangoes should prove helpful to those who might be interested in starting small-scale canneries near mango-growing centres.

THE MADRAS AGRICULTURAL JOURNAL

Hints to Contributors

The pages of the Madras Agricultural Journal shall be open ordinarily only to the members of the Madras Agricultural Students' Union.

All articles for publication should be addressed to the Editor, Madras Agricultural Journal, Lawley Road P.O., Coimbatore.

In view of the high cost of printing, contributions should be as concise as possible and should conform to the best usage in the leading Journals published in India and abroad.

Manuscripts should be typed with double spacing on one side of the paper only and with wide margin. They should not ordinarily exceed 5,000 words or 12 pages of printed matter including tables and illustrations in the Journal. Manuscripts should be carefully revised; numerical data and calculation checked. Main headings in the text should be typed in capitals with paragraph indentations and followed by a period and two hyphens. Sub-heads should be lower case and be underlined to indicate italics. Latin nomenclature and local terms etc., should be in italics. Original papers must conclude with summary of not more than 300 words drawing attention to the main facts and conclusions.

Tables: The number of tables should be restricted to those absolutely necessary, as numerous tables detract from the readability of the article. Each table should be numbered consecutively from 1 up and must have a heading stating its contents clearly and concisely. The tables are to be typed on separate sheets with their positions marked in the text.

Illustrations: Wherever possible illustrations should be made with pen and Indian ink for reproduction as line blocks. The name of the author, title of the article and figure number should be written on the back of each figure in blacklead pencil. Each figure should have a legend typed on a separate sheet.

Photographs: Photographs and wash drawings are more expensive as half-tone blocks are necessary. The cost of blocks is chargeable to the author of the article. Photographs submitted as illustrations should be unmounted, glossy prints of good quality, with strong contrasts, trimmed so as to include only the essential features to be illustrated. They should preferably be of the same size as desired in the printed paper. Photographs should always be packed flat, never rolled or folded.

Line drawings: Line drawings, and charts should be prepared in twice the scale desired in the printed form. All letterings, figure numbers and explanatory notes graphs should be light face and large enough to be 1/16″ high in the finished illustrations.

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References: References and reviews of literature should relate only to closely pertinent papers. The list of references should come at the end of the article, after the summary and should be arranged in alphabetical order of authors' names followed by the year of publication in brackets, and then the title of the paper, name of periodical, volume number in bold face type and then the page number, e. g. Darlingtion C.D., (1944) Heredity, devolopment and infection. *Nature* **154**; 164–9. Abbreviations for names of journals are to be in the approved form as given in the World List of Periodicals.

The responsibility for statements, whether of fact or opinion, rests entirely with the author of the article and not with the Editorial Board of the Madras Agricultural Journal.

Potato Cultivation at Kodaikanal

A Survey – Possibilities for Extension

By

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Introduction: Potato, is raised only over a limited area in this State. Practically the entire extent is confined to the higher plateau of the Nilgiris, amounting to about 19,500 acres, while the balance of 600 to 800 acres is located at Kodai hills and the Shevaroys of the Madurai and Salem districts.

This crop, which returns an average acre yield of nearly 10,000 lb. deserves further extension in view of its quick growth, high yield and nutritive value and ready response to cultural and manurial treatments. In recent years, fairly successful crops of potato were raised under irrigation. In certain parts of the State outside the Nilgiris, where the temperature range is between 60°F to 90°F during the winter period, (November-February). Even leaving such possibilities in the plains out of account, there are many hilly regions with mild climate and well-distributed rainfall, where its cultivation can be taken up with profit. Among these Kodaikanal shows rich promise.

This article presents briefly the information gained on the subject during a recent tour of survey and study of potato cultivation at Kodaikanal.

Location: Considered by many as the most beautiful hill station in South India, Kodaikanal stands at a height nearly of 7,000 feet above sea level on the Palni hills. Originally, this formed a retreat for the early settlers, chiefly European missionaries, and later it developed into an independent taluk of Madurai district, separating itself from Periakulam. It is surrounded by the taluks of Palni on the North, Periakulam on the South, Dindigul on the East and skirted by Udumalpet and United States of Travancore and Cochin on the West.

Area: The total area of 53,700 acres of the taluk is distributed as follows:

Forests	17,500	acres.
Not available for cultivation ...	3,500	do.
Other uncultivable land excluding current fallows ...	8,300	do.
Current fallows ...	1.650	do.
Net area sown under different crops	22,700	do-
Total	53,650	acres

The area under potatoes was recorded as 200 acres in 1945, the area during the 1951 season being 505 acres. Considering the favourable factors of soil and climate, there is very good scope for an extension of the current meagre area. In fact, under the present context of food scarcity, there is every need to augment the area by vigorous extension measures, as the natural spread has been too tardy for such a profitable, not-very-difficult-to-grow and early crop. It may be stated here that the Agricultural Research Station, Nanjanad was mainly responsible for the spread of potato cultivation in the Nilgiris from an initial area of about 500 acres, to the present extent of 20,000 acres, covering three distinct seasons. It should be easily possible to duplicate this result at Kodaikanal.

It is suggested that, with the use of parent seed material from the Nanjanad Research Station, primary seed farms may be started at Kodai and the produce recovered departmentally, to extend the area. In this way, a large extent of suitable land may be covered in the course of a few years. Petato is a recent introduction and, with publicity, the area should fan out beyond measure.

Climate: Seasonal conditions at Kodaikanal would appear to be very favourable for potato. Both the North-East and South-West monsoons contribute an average annual rainfall of about seventy inches, inclusive of summer showers. Frost is not a major problem and, in view of the heavy North-East monsoon rains, even long-term varieties can be raised during the second-crop season, which in the Nilgiris admits of only early varieties.

Soil Conditions: In general, fertile soils are available in the region. Nearly 60% of the area consists of light, red loams, while the rest are made up of black and peaty soils, rich in humus content.

Season: At present, as in the Nilgiris, rain-fed potatoes are confined to two distinct seasons. The main crop *(Kar bogam)*, which occupies 70% of the total crop area, is raised between April and August and the second crop (*Adi bogam*) between October and January.

Rotations: The common one-year rotation is potato, followed by garlic. Over scattered areas, a two-year rotation viz., potato, then a cereal like wheat, followed by garlic, is taken.

Seed Material: No specific variety is used. Most of the cultivators get their requirement of seed from the freshly harvested ware, marketed by merchants at Mettupalayam or Bangalore. The value of good seed for optimum yield being an accepted fact, it should be brought home to the growers in this region. Seed should conform to a specific, known and tested variety, to ensure good yields, quality and freedom from disease. At present, the main crop produce supplies the seed for the second crop and vice versa.

(a) **Cultivation Details:** *Preliminary cultivation.* The soil is opened up by mamooty, which implement is used for all the subsequent operations of ridging, covering, and interculture and harvest. Small terraces, six to twelve feet in width, are made by clearing new lands for raising the crop.

• (b) **Planting:** Tubers of all sizes are planted indiscriminately inside furrows spaced 2½ feet apart, ranging from very small chats ordinarily unfit for seed, to big-sized table tubers the use of which is definitely wasteful, as proved by trials at Agricultural Research Station, Nanjanad.

(c) **Manuring:** Cattle manure, applied at five to ten tons per acre, is the common practice. Except for very stray and unplanned use of artificials, this is the rule. An urgent change is necessary in this regard, especially when one considers the indifferent way in which the ryots usually store the dung and litter, without proper covering and preservation.

Among all food-crops, probably none can equal the potato, in regard to quick and striking response to manuring. The ever-increasing popularity of the "Nanjanad Mixture", in the potato belt of the Nilgiris, stands out for evidence. Presumably, the Kodai soils are rich, since they are currently yielding five-fold, even without fertilizers. Layout of demonstration plots, to prove to the ryot the huge profits possible by manuring will certainly result in a quick spread of the acreage.

While on the question of manures, the best thing to start with would be the introduction of green manures in the rotation. Blue bitter lupins have been found admirably suited for the seasonal conditions and the elevation of the Nilgiris and should answer equally well at Kodai, as the ideal green manure crop for potato, improving, as they do, the soil condition and crop yields.

Yield: The present acre yield ranges between 4,000 and 5,000 lb. The tubers are lifted by mamooty, resulting in a large percentage of rejects, which depresses the market value of the ware. The use of bullock-drawn lifters, to open the soil and expose the tubers, enables a quicker, better and cheaper method of harvest.

Diseases: The crop, is usually subject to virus diseases, though the severity of infection is low. Plant protection measures and the use of selected seed should overcome the loss in yield on this account.

Cost of Cultivation: The expenses incurred by the cultivator and the returns obtained are as follows:

Charges per acre.

	Rs.	As.	Ps.
Preparatory Cultivation.			
Opening land: 40 men @ Re. 1—8—0 each	60	0	0
Laying out ridges and furrows; 30 men	45	0	0
Total	105	0	0

Seeds and Sowing.		Rs.	As.	Ps.
40 Maunds of seed @ Rs. 6/- per Md. (25 lb.)		240	0	0
Planting and covering: 20 men @ Re. 1—8—0		30	0	0
	Total	270	0	0

Manures and Manuring.		Rs.	As.	Ps.
Cost of 10 cartloads of cattle manure inclusive of transport	Total	40	0	0
After Cultivation.				
Three instalments of earthing up, after weeding, 40 men at Rs. 1—8—0 each	Total	60	0	0
Harvest.				
20 men @ Rs. 1—8—0 each and 10 women @ Rs. 0—12—0 each ...	Total	37	8	0
Cost of Cultivation	Grand total	512	8	0

Receipts.	Rs.	As.	Ps.
Average yied of 200 maunds of 25 lb. each @ Rs. Rs. 4/- per maund	800	0	0
Less total charges ...	512	8	0
Net profit per acre ...	287	8	0

Even with the present indifferent factors in cultivation like absence of good seed and labour-saving implements and lack of manuring, the ryot is able to secure nearly Rs. 300/- per acre as profit. This return can be considerably stepped up with the improvements indicated.

Acknowledgement. My grateful thanks are due to the Director of Agriculture, Madras, for the grant of a tour of study, to the Agricultural Demonstrator, Kodaikanal, for the help and facilities afforded, and to K. Saptharishi, Superintendent, Agricultural Research Station, Nanjanad, for his help in the preparation of this article.

Cost of Small-Scale Production of Canned Mangoes

By

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At the Government Fruit Products Research Laboratory, Kodur, a series of investigations were taken up since 1943 to stand ardise methods for the preservation of the important fruits of South India. Preliminary details regarding the economics of fruit preservation as a cottage industry have been published by Siddappa, (1949). The most important from the preservation point are the mangoes and the citrus fruits. Intensive research has been taken up to standardise different methods of preservation of these two fruits. Full details regarding these will be published elsewhere. In the course of these studies it was thought useful to work out the cost of production of canned mangoes on a small scale using laboratory or home-scale equipment. The method has been described by the author elsewhere. (Siddapppa; 1950). The details of the working of the cost of production during June—July 1950, are given in this paper as they may be of interest in these days, when great emphasis is placed on the development of small-scale and cottage industries.

Material and Methods: *Material:* The fruit used for canning was got from the Government Fruit Research Station, Kodur and the surrounding orchards at current market rates. Although several varieties of mangoes were available at the Research Station, only four of the commercially important varieties were selected. These were Baneshan, Alampur Baneshan, Neelum and Bangalora. Of these, the former two are high class dessert varieties with thick and smooth flesh, free from fibre and give a very good canned product. Neelum is available in very large quantities during the season. It is fairly good for canning. Peeling of the ripe fruit, however, renders it soft and pulpy. There is much fibre also in the pulp. The fruit has a tendency to ripen at the tip first. The fruit should be firm ripe for canning. Bangalora mango, although large in size and has a rich pulp of good texture, is poor in flavour. The canned product is of fair quality only. Since these four varieties of mangoes are the ones likely to be available for canning during the season, all of them were used, inspite of there being some difference in the quality of the canned product. The fruits were ripened in the laboratory and canning-ripe ones taken out for canning in lots.

Methods of Canning: Fully ripe, but firm, fruit was taken, washed well in water and peeled by means of a stainless steel knife by working it round the fruit. The two sides were then sliced off, and each slice cut

into two halves. The pulp on the thin side of the stone was removed in two sections. Thus from each fruit, six longitudinal slices of approximately equal size were obtained. These were filled into A 2½ size plain cans and covered with sugar syrup of 40 degree Brix at 175–180°F, leaving a headspace of about ¼ of an inch. The cans were then exhausted in hot water at 185–190°F for 10 minutes and sealed hermetically by means of a small Dixie automatic double seamer. The sealed cans were processed in boiling water for 30 minutes and then cooled quickly in cold water to prevent 'over-cooking' during storage.

Cost of Production: The cost of production of an A 2½ can of mangoes was worked out making use of the data collected in a set of twelve small-scale experiments. Details regarding the variety and quantity of fruit, weight of sugar used and the number of cans packed on each day are given in Table I. The total quantity of each variety of fruit used and the price paid are shown in Table II.

Charcoal and kerosene oil were used for preparing syrup and exhausting and processing. A charcoal oven was used mostly for heating the sterilizing water in an open aluminium vessel. One mazdoor was employed at Re. 1/- per day to help in the day's work. The other two workers, who were members of the staff, consisted of one canning assistant and one laboratory attender.

Complete details for the working of the cost of production of an A 2½ can of mangoes are given in Table III.

Discussion: The yield of slices suitable for canning is about 50–55 per cent of the total weight of fruit depending upon the variety and ripeness of the fruit purchased. An A 2½ size of can holds about 18 oz. of prepared slices. On the basis of a yield of 50 per cent of slices, the weight of fruit required per can is 36 oz. In Table I, 392 cans were packed from 856 lb. 3 oz. of fruit purchased and ripened to proper extent before canning. On an average, 2 lb. 3 oz. of fruit as purchased and ripened were actually required to prepare one A 2½ can. Even if wastage should be large, 2½ lb. of fruit would do for packing an A 2½ can. On account of this extra quantity of about 4 oz. of fruit the cost of fruit per can will be increased by about half an anna only.

As already mentioned, about 50 per cent only of the weight of fruit is recovered in the form of slices, the rest being made up of peel (20–22%), stone (16–18%) and trimmings and scrapings of pulp from the stone (12–14%). The scraped pulp and trimmings can be utilized for making mango jam. This, however, need not be taken into consideration while working out the cost of production of canned mangoes, since the major cost in jam making will be that of sugar. The approximate yield of 50 percent of slices allows for any wastage during the ripening of fruit purchased, slightly under-ripe, and ripened subsequently. In the

experimental data reported, the fruits were actually ripened in the laboratory before canning and such contingencies have, therefore, been allowed for already in the data in Table I.

Investment: The cost of production is based on a small-scale basis only, where the equipment used is very small. The provision of four annas per unit for meeting the depreciation and interest charges on building, equipment, and working capital and overhead charges leaves a wide margin.

The only costly equipment required for canning about 100 cans per day is a good can sealer costing about Rs. 200/-. The other items like aluminium vessels for preparing syrup, exhausting and cooking, knives, balance, working bench, trays, kerosene oil stove, charcoal ovens, thermometer, Brix hydrometer etc., will cost about Rs. 500/-. By adding additional equipment at a cost of about Rs. 1,300/- other products like jam jelly, fruit juices and squashes, candied fruit etc., can be prepared and the staff can be kept engaged for about 6 months in a year and thus depreciation and overhead charges per unit of production reduced. The building will be the costliest item and this cannot be avoided. This preparation room should be fly-proofed with wire gauze doors and windows. The walls and floor should be smooth and washable and there should be a good drain. A room $10' \times 12'$ will be sufficient for the preparation room. Raw materials, containers, finished products, etc., can be conveniently stored in a separate room which need not necessarily be of any special type. The preparation hall may cost about Rs. 1,500/-. The addition of a small shed at a cost of about Rs. 1,500/- will be highly useful. The total cost on buildings will thus be about Rs. 3,000/-.

Establishment: One trained person should look after the day-to-day work. One or two skilled mazdoors under him will be highly useful. Together they can attend to the daily production of about one hundred units of canned fruit.

Working Capital: The capital required for the purchase of raw materials, containers, etc., can be taken on an average of about one rupee per standard can of fruit or bottle of squash.

Depreciation, interest and overhead charges: The details under this head are as follows:

1.	Depreciation on buildings costing Rs. 3,000/- at 5 percent ...	Rs.	150/-
2.	Depreciation on equipment costing Rs, 2,000/- at 10% ...	,,	200/-
3.	Interest on capital investment Rs. 5.000/- at 6% ...	,,	300/-
4.	Interest on working capical of Rs. 10,000/- (i. e. $\frac{2}{3}$rd of the total Rs. 15,000/-) ...	,,	500/-
	Total of depreciation and interest charges ...	,,	1,150/-

Overhead Charges:

One trained assistant @ Rs. 150/- p. m.	... Rs.	1,800/-
One skilled worker @ Rs. 50/- p. m.	... ,,	6,00/-
Total	... Rs.	2,400/-

Total of Depreciation, interest and overhead charges (Rs. 1,150/- + Rs. 2,400/-) = ... Rs. 3,550/-

Assuming a production of 100 units per day for a working of 25 days in a month for six months in a year the total number of units of production will be 100 × 25 × 6 = 15,000.

Depreciation, interest and overhead charges per unit will thus come to 3·79 annas. This is rather on the high side. It will be ample if four annas per unit are added to the cost of production to meet these charges.

Retail price of an A 2½ can of mangoes: In working out the retail sale price, allowance has to be made for various incidental charges such as labelling, packing, railway freight, losses, wholesale and retail dealer's commission, profit, etc. The following are the details under these heads.

Cost of production of one A 2½ can of mangoes inclusive of depreciation, interest and overhead charges at 4 annas per unit	... Rs.	0–15–0
Probable losses during storage etc., @ 6·7%	... ,,	0–1–0
Packing charges, etc., at Rs. 3/- per case of 24 cans	... ,,	0–2–0
Railway freight to destination	... ,,	0–2–0
Hence, cost per can F. O. R. destination	... Rs.	1–4–0
Add 1. Wholesale and retail commission at 20%	... ,,	0–4–0
2. Profit at 20 percent of marked price for wholesale trade	... ,,	0–4–0
Hence retail price should be	... Rs.	1–12–0

This is a reasonable and competitive price at present.

The price paid for the different varieties of fruit during 1950 is a normal one. It is, however, likely to be slightly more in places away from the growing centre, to include packing, transport and losses in transit. The cost of charcoal at Rs. 4—4—0 per bag of 80 lbs is also normal. Four persons working together can easily pack 100 cans of mangoes in a day. The cost of an A 2½ can of mangoes comes to Rs. 0—14—11 or Rs. 0—15—0, which is reasonable. While the cost of the contents of the

can including processing and labour charges was only Re. 0—7—1, the cost of the container alone was Re. 0—3—10 that is, nearly half of it, The retail sale price of an A 2½ can of mangoes can be fixed at Rs. 1-12-0, which will allow for various incidental marketing charges such as labelling, packing, transport, commission, probable losses, etc., and also leave sufficient margin for profit to the small-scale producer.

Conclusion: In mango growing centres, where suitable varieties of mangoes are available, their small-scale canning can be taken up with advantage. It is, however, necessary for the person taking it up to have a thorough training in the technique. Suitable marketing facilities also are essential to make the scheme a success.

Summary: Details have been worked out for the small-scale production of canned mangoes,

The cost of production of an A 2½ can of mangoes including depreciation and overhead charges, is Re. 0—15—0. which is reasonable. The retail sale price may be fixed at Rs. 1—12—0 per can to allow for incidental marketing charges and a safe margin of profit.

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1. Siddappa, G. S. 1949. Economics of fruit preservation as a cottage industry. Madras Agric. J. 36. Feb. pp. 60—81.
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TABLE I

Small-scale canning of Mangoes

Expt. No.	Date	Variety of Mango	Weight of fruit taken	Weight of sugar used	No. of A 2½ size cans packed	Remarks
			lb. oz.	lb. oz.		
1.	14—6—1950	Alampur Baneshan	39— 0	8— 6	21	
2.	16—6—1950	do	26— 8	5— 7	15	
3.	15—6—1950	Baneshan	145— 6	27— 0	73	
4.	16—6—1950	do	115— 6	22—13	63	
5.	17—6—1950	do	46—12	9—13	20	
6.	10—7—1950	Neelum	26—12	5—10	13	
7.	11—7—1950	do	30— 8	5—10	14	
8.	12—7—1950	do	137— 0	23— 0	61	
9.	13—7—1950	do	47— 9	9— 9	24	
10.	18—7—1950	Bangalora	160— 0	19—11	51*	*Nearly 40 percent of the slices, being soft, were used for jam.
11.	19—7—1950	do	60— 8	9—13	26	
12.	20—7—1950	do	21— 8	4— 4	11	
		Total	856— 3	151— 0	392	

TABLE II

Quantity and cost of different varieties of mangoes canned

Item No.	Variety of mango	Quantity	Rate per pound	Amount	Remarks
		lb. oz.	Rs. A. P.	Rs. A. P.	
1.	Alampur Baneshan	65 — 8	0—2—6	10—3—9	
2.	Baneshan	307 — 8	0—1—6	28–13—3	
3.	Neelum	461 — 11	0—1—0	28–13—9	
4.	Bangalora	21 — 8	0—0—9	1—0—2	
	Total ...	856 — 3		68–14–11	

TABLE III

Cost of production of an A 2½ size can of mango slices

Item No.	Particulars	Quantity	Rate	Amount
			Rs. A. P.	Rs. A. P.
1.	Fruit (Mixed varieties)	856 lb. 3 oz.	Different rates	68–15—0*
2.	Sugar	151 lb.	0—7—4	69—3—0
3.	Kerosene oil : bottles	30	0—4—0 (per bot.)	7—8—0
4.	Charcoal	2 bags	4—4—0 (per bag)	8—8—0
5.	Labour, man days	20	1—0—0	20—0—0
6.	Cost of contents of 392 A 2½ cans of mango slices			174—2—0
7.	Cost of contents of 1 A 2½ can of mango slices			0—7—1
8.	Add, (i) cost of can			0—3–10
	(ii) overhead charges and depreciation			0—4—0
9.	Cost of one A 2½ can of mango slices			0–14–11 or 0–15—0

* Details are given in Table I.

Cultivation of Bananas for Leaves in Tanjore District

By

D. DANIEL SUNDARARAJ, B. SC. (AG.),

ASSOC. I. A. R. I., M. SC.,

Banana, besides being an important food crop capable of yielding on an average 20,000 to 25,000 lb. of food per acre in a year, is also a valuable money crop. The intensive cultivation of bananas is practised mostly for its fruits. Its cultivation for the purpose of leaves, except in parts of the Tanjore district and to a very little extent in Tiruchirapalli district, is not known anywhere else. In other parts of the State, one or two ratoon crops of bananas for bunches are taken after the main plant crop; subsequent to this, all the suckers of the harvested plants are allowed to grow for about four to six months and the leaves are harvested. When the crop is intended for fruits, removing even a single leaf from the plant is strongly objected to by the ryots as it would affect the size and weight of the bunch. Hence the leaves are cut only from the side suckers or from the plantation which is proposed to be destroyed and replanted. In the Tanjore district round about Thiruvayar and in parts of Papanasam taluk, bananas are cultivated for the sake of the leaves. The crop stands in the field for two years. A crop of bunches is taken in the first year plant crop; the ratoon crop, subsequent to the harvest of bunches, is the one for the leaves. The leaf crop in the second year fetches more profit than the first year bunch crop. Such cultivation for the purpose of the leaves extends to about 2,000 acres in the above places.

Varieties and Planting material: The varieties planted for leaves are mostly Poovan and Monthan. Poovan is preferred as its leaves (1) have better keeping quality than Monthan, (2) are broader and thicker, and (3) have a pleasant appearance due to the light tinge of purple on the midrib. The leaves of Poovan are said to keep for over ten days while that of Monthan only for about five or six days. The variety Monthan is preferred only for the plantings taken up during June—July (i. e., *Adipattum*) as its harvesting period will then synchronise with the marriage season from August onwards when there is a great demand for the fruits for vegetable purposes. Monthan planted at this period is also said to stand the summer drought better than Poovan. But the main planting season is November—December known as *Karthigaipattam* when Poovan is the main variety.

The suckers for planting purposes are mostly obtained from the perennial areas of Aduthurai and Narasingampet in Kumbakonam taluk, though intensive cultivation of bananas is done in the villages of

Tiruchiraplli district. Both around Aduthurai and Narasingampet, bananas are cultivated on high level lands known as the *padugai* lands without any irrigation. With the receipt of water in the channels, there is a rise of the water table and this helps to increase the soil moisture favouring the growth of bananas. The ryots are of opinion that the suckers obtained from these perennial unirrigated areas have bigger and well developed rhizomes than those raised in wet lands or irrigated crop of Tiruchirapalli district. It is for the same reason that their own local suckers are not made use of for the purpose. It is also believed that since bananas are being cultivated under dry unirrigated, perennial conditions in Aduthurai and round about, the suckers from these plantations are hardy and establish also quickly.

Harvesting of leaves: In the first year crop all the suckers are regularly desuckered till the plants come to flower. Once the bunches are thrown, then only are the suckers allowed to grow. At this stage of the crop, a second dose of groundnut cake at the rate of about 1 lb. per plant is given. This application helps both the suckers and the bunch to develop. At the time of harvest of the bunch, the followers-on will be three to four months having attained good growth.

In bananas, it is generally the second year crop that is vigorous in growth and is a better yielder than the planted crop or the second and the subsequent ratoon crops. Usually one or two suckers are allowed to grow big so that good-sized leaves may be obtained from them. According to the fertility of the land, cultural operations and season of the year, two to four leaves per plant are cut for a month. Taking a minimum of two suckers per clump and at an average of two leaves per month per individual plant, about 50 leaves will be harvested in a year from a clump. The leaves produced in the *Kodikal pathi* (betel-vine areas) are usually much bigger and are popularly called the '*Thattu Ilai*' and fetches the maximum price. Only the young and the just 'unfolding tubular' leaf is cut a little above the lamina base leaving six to nine inches, From May to July, a few ryots practice tying up of the unfolding leaves with the leaf sheath fibre to prevent tearing off by wind.

Hundred leaves including about 50 big and 50 small and medium sized ones are tied together into a bundle. The bundling of the leaves is a specialised work of this area and one can easily make out the Tanjore bundle from the bundles of other districts. The leaves are exported to almost all the important towns on the East Coast up to Madras. The ryots either lease out their crop on a contract basis or cut the leaves themselves, bundle them and auction them in the market where the agents for the export merchants purchase them at prevailing rates. The maximum demands are at the marriage seasons when the price for a

bundle of 100 leaves may be up to 12 rupees. During slack periods it may go down sometimes to even one rupee. An average of Rs. 3—0—0 per bundle of 100 leaves may be taken as the average for the year.

The cost of cultivation in the first year amounts approximately to Rs. 500/- while in the second year it is about Rs. 400/- per acre. The receipts for the first year being only of the bunches, is about Rs. 1,000/- on a moderate valuation and in the second year the leaf crop fetches easily Rs. 1,500/- The net profit for the two years is nearly Rs. 1,600/-.

Possibilities of improvement: The greatest need of the ryot seems to be better marketing facilities organised on a co-operative marketing basis, which will eliminate the intermediate agents, fetch better returns and help in the quick disposal of the produce.

Since the leaves of bananas are regularly in demand in all the towns and cities of the South, investigations on this aspect of bananas will be of economic importance. The points which have to be considered in the selection of varieties for the purpose are (1) the quick production of leaves (2) good tillering capacity (3) broad and medium thick leaves suitable for packing and capable of standing transport (4) good keeping quality and (5) attractive appearance. A few varieties of the Monthan and Peyan group have the first three characteristics which may well suit the purpose. Investigations on *Musa balbisiana,* Colla *(Ela vazhai* or *Ginjali aratti)* and *Musa textilis,* Nees. (the Manilla Hemp Banana) may also help as these two are seeded bananas, the fruits of which are not edible and as such the consideration of fruits being affected by the cutting of leaves can be well eliminated. It may be mentioned here that there are two wild bananas found in the forests of Western Ghats, *Eusete superba* [*Syn. Musa superba* (Kattu vazha or Mala vazha)] *Musa* sp. *(Kattu vazha)* which are made use for the collection of leaves. These leaves collected in the interior of forests are brought down to nearby towns for disposal. One can easily get the leaves of the former, at Kozhikode, and those of the other at Valparai.

Acknowledgement: The paper is the result of an enquiry made during a survey undertaken in the district as part of the work of the scheme of the Central Banana Research Station, Aduthurai which is partly financed by the Indian Council of Agricultural Research. The author is thankful to the district staff for help in the enquiry.

Nutritious Forage from Napier and Guinea Grasses

By

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(Reprinted from Indian Farming, Vol. XI, Nov.—Dec. 1950)

Napier and Guinea grasses are recognized drought-resistant forage crops. They were introduced into the Punjab in 1926, and because of their long life and capability of giving high yields of green stuff without much effort or care were finally recommended for cultivation in the State in 1931. Both these grasses are perennial and supply large quantities of green forage and allow a good number of cuttings during the year. Under irrigation and adequate manuring Napier and Guinea grasses may give as much as 1,000 maunds and 600 maunds of green fodder per acre, respectively. Unless they are cut and used as feed at the stage of optimum growth, they are not likely to provide large quantities of quality and palatable forage.

Both the yield and nutritive value are important prerequisites which determine the acceptance and popularity of forage crops. A study of these factors with respect to the grasses named above, undertaken at the Fodder Research Station, Sirsa in 1937—'38, revealed that these grasses gave large quantities of green forage of high nutritive value if they were cut at the stage of optimum growth at an interval of about 1½ to 2 months, when their leaves were fully developed and flowering stalks were just forming.

Specific experiments were conducted by planting Napier grass 3 ft. each way and Guinea grass 2½ ft. from row to row, and 2 ft. from plant to plant, in unit sub-plots of four rows each on March 4, 1937. Both of these grasses registered good growth and were harvested according to the following schedule :

(a) Cut at interval of four weeks, when the plants were young.

(b) Cut when leaves had fully grown and flowering stalk had begun to form at intervals of eight weeks.

(c) Cut in advanced stage, when canes had formed in the Napier grass and Guinea grass had flowered, i. e. at an interval of 12 weeks.

Yield of forage: The grasses sprout in spring and grow luxuriantly during summer, especially during the monsoons. Thereafter the growth slows down and becomes even stunted. The plants dry up and may even be killed by frost in December or January. After taking the preliminary

non-experimental cutting in June in which Napier grass gave 137 maunds and Guinea grass gave 54 maunds 37 seers per acre, cuttings of both these grasses were taken according to the schedule mentioned above. The summary of green fodder yield data taken from both these grasses is given in Table I;

TABLE I

Total yield of green fodder per acre

Interval between successive cuttings from June to December, 1937	Total of cuttings taken up to June	Total yield of green fodder			
		Napier grass		Guinea grass	
		Total yield	Percentage difference from four weeks	Total yield	Percentage difference from four weeks
		Md. Sr.		Md Sr,	
4 weeks	6	526—0	100—0	87- 8	100,0
8 weeks	3	561—8	107—6	186—15	213,8
12 weeks	2	752—0	144—2	141—16	70,1

From Table I, it will be observed that Napier grass yielded much more than Guinea grass in all the three treatments.

The differences in the yield of green fodder in the two treatments, viz. cutting at four weeks', eights weeks' interval, were not significant in the case of Napier grass. The quantity of forage obtained from a 12-week cutting interval was significantly higher than both these treatments. But on account of coarseness and the development of canes during a longer interval of 12 weeks the quality of forage obtained was much inferior to that obtained in the two treatments. In other words, higher production of less desirable feed was obtained with a longer interval of 12 weeks' duration as compared to lower production of better and more palatable fodder in the first two treatments. The variations in the yield of green fodder as a result of these cutting treatments were very pronounced in the case of Guinea grass. The out-turn was the lowest in the first cutting treatment of four weeks. It was more than doubled in the second treatment indicating its superiority over the first. The yield was less in the '12 week' than that in the '8 week' interval by about 20 per cent, because most of the leaves had dried up by that time but was definitely higher than in the '4 week' cutting interval because of more growth during this period.

From the observations it will be seen that to obtain best results, both as regards yield and palatability, both these grasses should be cut at intervals varying from six to eight weeks during the growing season.

Quality of forage: The quality of forage was assessed on the basis of its palatability and chemical composition. It was observed that the effect of different intervals on the quality of forage, though considerable, varied with the species of the grass. Although in the initial stage, both the grasses grow quickly and are highly leafy, yet Napier grass is conspicuous by its subsequent rapid tendency to develop fairly thick canes. If this grass is allowed to grow uncut for 2½ to 3 months, it becomes very coarse, as a consequence of which it becomes less palatable. At a somewhat more advanced stage of growth, it altogether ceases to be a palatable feed for cattle. On the other hand Guinea grass is distinctly more palatable and it remains so for a longer period than Napier grass; its chief characteristic is that it usually bears fine leaves which multiply and persist much longer, even upto the stage of the appearance of panicles.

The results of chemical analysis on dry matter basis of both the grasses cut at varying intervals are given in the Tables II and III.

TABLE II

Effect of various intervals between cuttings on the yield and composition of Napier grass

Interval between two successive cuttings	Date of cutting	Yield of green forage per acre in lb.	Analysis of composition						
			Ash per cent	Fat per cent	Crude fibre per cent	Protein per cent	Nitrogen free extract per cent	Calcium as CAO per cent	Phosphorus as P2Q5 per cent
A. *One Month*									
First cutting	14—7—35	19088	19·55	1·07	31·35	8·98	39 05	0·66	0 88
Second ,,	14—8—35	13448	15·26	1·07	29·89	4·87	48·91	0·55	0·73
Third ,,	14—9—35	8728	16·24	1·17	31·30	8·78	42·51	0·74	0·91
Fourth ,,	14–10—35	1476	16·26	1·17	26·04	9·33	47·20	0·69	1·15
Fifth ,,	14–11—35	294	21·22	1·54	23·43	11·86	41·95	1·34	1·25
Sixth ,,	12–12—35	294	19·36	2·09	21·41	14·35	42·79	1·71	1·66
B. *Two Months*									
First cutting	14—8—35	40474	13·25	0·94	34 02	4·87	46·92	0·32	0·62
Second ,,	14–10—35	4722	13·62	1·35	32·58	5·62	46·83	0·44	0·83
Third ,,	14–12—35	820	17·72	1·81	23·53	13·50	43·44	1·22	1·53
C. *Three Months*									
First cutting	14–9—35	591578	11·76	1·15	35·99	6 92	44·18	0·38	0 71
Second ,,	14–12–35	2656	17·21	1·50	24·67	12·51	44·11	1 04	1·50

TABLE III

Effect of various intervals between cuttings on the yield and composition of Guinea grass

Interval between two successive cuttings	Date of cutting	Yield of green forage per acre in lb.	Analysis on per cent basis						
			Ash per cent	Fat per contt	Crude fibre per cent	Pro-tein per cent	Nitro-gen free extract per cent	Calcium as CAO per cent	Phos-phorus as P2O5 per cent
A. *One month*									
First cutting	14-7—35	1964	14·15	1·89	35·26	11·05	37·65	0·79	0·39
Second ,,	14-8—35	2194	13·29	1·52	34·25	6·27	44·67	0·93	0·52
Third ,,	14-9—35	1104	15·29	1·63	33·02	8·90	41·16	0·93	0·72
Fourth ,,	14-10-35	1400	15·63	1·65	29·00	8·78	44·94	0·98	0·89
Fifth ,,	14-11-35	258	18·61	1·37	23·66	14·35	42·01	1·22	0·58
Sixth ,,	14-12-35	214	17·45	2·60	24·86	13·92	41·17	0·86	1·13
B. *Two months*									
First cutting	14-8—35	8724	12·09	1·65	38·64	4·45	43·17	0·64	0·37
Second ,,	14-10-35	6192	13·72	1 89	34 66	5·80	43·93	0·76	0·53
Thirp ,,	14-12-35	344	18·05	2·38	26·20	10·58	42·79	1·51	1·02
C. *Three Months*									
First cutting	14-9—35	11164	9·71	1·81	39·84	3·24	45·40	0·49	0·33
Second ,,	14-12-35	1004	15·27	2 23	36·40	7·34	38·76	1·35	0·87

The results of analysis pertaining to Napier grass show that the fibre content of its first cutting after an initial interval of three months uninterrupted growth, was the maximum, viz. 35·93 per cent as compared to 31·55 per cent and 34·02 per cent respectively, of the first cutting of one and two months interval. This, in other words, means that the longer the first cutting of the Napier grass is delayed, the lesser will be its palatability because of its enhanced fibre content. Unlike it however, the fibre content of the last cuttings of the various intervals were substantially low, 21·41, 23·53 and 24 67 per cent, respectively, for one, two and three months intervals, vis-a-vis the first cuttings of these intervals. The percentage of protein, fat, calcium and phosphorus showed a steep rise in samples of successive cuttings of various intervals with the exception of first three consecutive cuttings of one month interval.

In Guinea grass, the results show that fibre, fat and calcium contents of the cuttings at various intervals were like those of Napier grass. It is interesting to note however, that forage of Guinea grass of various cuttings has invariably given higher fat values as compared to the corresponding values in Napier grass. The protein content (11·05 per cent) of its first cutting after one month's growth was considerably higher than the corresponding values of 8·98 per cent of Napier grass. But there was a marked, though gradual and consistent decrease in the protein contents of

first cutting of Guinea grass with increase in the cutting intervals. The comparatively lower ash content of the Guinea grass indicates the softness of its texture as a feed for cattle.

Taking an over all view of the various aspects of quality it may be concluded, that Napier grass can be profitably cut after one or two months growth before cane formation and development of coarse leaves. The superiority of Guinea to Napier grass as a feed is indisputable. The former would provide abundant succulent feed if the interval between two successive cuttings is limited to two months. But the longer these grasses are allowed to grow, i. e. beyond two months, the more fibrous and hence coarser they become, which adversely affects their palatability and nutritive value.

OBITUARY

We regret to announce the sudden and untimely demise of one of our distinguished patrons, Sri V. Arumugam Pillai,

at Rathnasabapathipuram, Coimbatore on 11-12-1951. Apart from his prominent place in the civic life of Coimbatore, he took also a very keen interest in the welfare of the peasants and the improvement of agriculture in general. He was a member of the Taluk and District Boards and was the Chairman of his Village Union Board for a number of terms. He was also a Trustee of the Perur Devasthanam for over ten years. He leaves behind his wife, one son and a daughter. May his soul rest in peace.

Agriculture News Letter, Australia

Australian Pigs Set World Record: Pig-raising investigations at the research farm, Rutherglen, Victoria, have resulted in the production of an average litter weight of 200·4 lb. per pig at the average age of 168·3 days for 19 litters taken to bacon weight. This is believed to be unequalled. Examination of comparable experiments overseas does not disclose anything to approximate this result. The Victorian Department of Agriculture has produced the finest uniform group of large whites seen in Australia, stressing the value of selective breeding. Two meat trade leaders, including the Chairman of the Australian Meat Board, Mr. J. L. Shute, conceded that the Rutherglen large whites were superior to the best pigs in Denmark, which were previously considered the world's best.

Success with Hybrid Maize: An interesting feature of a hybrid maize crop, harvested by Mr. J. Pomeroy. of Berry, New South Wales, yielding 162 bushels an acre, was that a check when the bulk of it was made into silage showed that 80 per cent of the stalks carried two cobs.

A half-acre left to ripen was harvested, and the cobs from this, shelled out, yielded 81 bushels or at the rate of 162 bushels per acre. In addition to the advantage of a heavy yield for grain, the hybrid, which was estimated at 30 tons per acre green fodder, was superior to the previously popular Fitzroy variety for this purpose and also for silage. At the time of cutting, in addition to greater weight per acre, the leaves were all green and succulent, in contrast to Fitzroy, on which, at this stage, the leaves had dried out. The variety, used, standfast, in common with another recommended variety, Ensign, is derived from Fitzroy. Other high yields, of 140 to 150 bushels per acre, have been achieved in the district.

Nutrition Essential for Increasing Wool output: Geneticists could take a 50 year holiday in Australia while the nutrition side of animal husbandry put its house in order, declared Dr. M. C. Franklin, Principal Research Officer of the Commonwealth Scientific and Industrial Research Organisation, at a recent meeting of the Quensland Division of the Society of Animal Production. Dr. Franklin pointed out that Mr. F. B. Morrison, world authority on nutrition and better known as author of "Feeds and Feeding", had been invited to Argentina to advise on ways and means of improving the livestock industry. He had reported that geneticists in that country could take a 50 year holiday. Dr. Franklin said that the same thing applied to Australia.

Mr. A. M. Baxter, Assistant Manager of the Australian Estates Co., Ltd., said that having managed large flocks in the three divisions of Queensland, the Gulf' Central West and Far South-West he was entirely in agreement that nutrition was the most important factor. Mr. Euston Young, another large estate manager, said that there was a huge field in Australia for working to make better use of the country. By progressive methods his company had virtually eliminated droughts and had only two bad years in 50.

New Grass Makes Surprise Debut: The surprise appearance of a new Australian immigrant in the form of a useful fodder grass from America, recently attracted considerable interest amongst authorities at the Victorian National Herbarium. The newcomer is Pleuropogon Californicus or Californian semaphore grass. It reached the Herbarium authorities in the shape of a specimen sent by a

dairy farmer of Flinders Island off the Victorian coast. Experts said that it was the first officially recorded growth of the grass in Southern Australia. The Herbarium possessed dried samples of the grass, but these had been imported from the country of their origin.

The farmer, who sent in the specimen, said that is had appeared unexpectedly in his garden. It was a marvellous grower, was about four feet high and showed a massive amount of grass to one plant. He asked whether the seeds were worth saving and if the grass had fodder value. In identifying it as a specimen of a Californian grass with good fodder value and one that good be made into hay and chaff, the experts suggested that the seeds should be saved, and a complete plant should be submitted. How the grass entered the farmer's property is a mystery. Canadian semaphore grass prefers to grow in moist soil, or along the edges of a swamp. In appearance it resembles field fescue and prairie grass and is a prolific grower.

Cross Pastures do well: A hybrid mixture of Italian and English cross pastures, with clovers, called "H-1", is proving highly successful in Southern Tasmania. Several leading dairymen declare that nothing can approach the mixture as a feeding basis for milking herds, because of its remarkable carrying capacity. One Huon Valley dairyman has a 3½ acre patch of H-I, which recently had a lush growth of two feet, and is expected to yield a rich hay harvest. The pasture was "crowned" during cultivation, a distance of at least a chain being left between the crowns to allow for adequate drainage. The dairyman expects that the pasture will cut between 350 and 400 bales, an average of more than 100 bales to the acre.

College has Proud Record: Hawkesbury Agriculturel College, in the State of New South Wales, and Australia's oldest agricultural college, has turned out over the years some 4,850 students, of whom about 80 per cent are engaged in some form of agriculture. College graduates include the holders of many official positions in all parts of the world, in addition to successfull farmers all over Australia. In recent years, three Directors of Agriculture, three Directors of Dairying, a Land Board Chairman, a Commissioner of the Rural Bank of New South Wales and a Commonwealth Supervisor of Dairy Exports have been old boys of the College. The agricultural field staff and the dairy technical staff of the New South Wales Department of Agriculture, all of whom have the full confidence of the State's farmers, are composed almost entirely of Hawkesbury graduates.

The influence of Hawkesbury College on general agriculture in all parts of Australia has been great. Throughout its teaching there has always been insistence on the fact that a scientific grasp of the principles underlying all operations on the farm is essential to successful agriculture. Each graduate takes away with him a body of systematic and digested knowledge that he can readily apply. The college farm of 3,500 acres is a great outdoor laboratory to that end. The dairying industry, in particular, has absorbed graduates of the college. In the last 20 years approximately one-third of its diploma holders have taken up positions in other States, where they have achieved signal success in teaching the principles of sound and economical farming.

Production of Beef Cattle: Australia had a tremendous potential for beef cattle production, probably the greatest of any country in the world, said Mr. Terence G. O'Dwyer, Deputy Manager of the Australian Mercantile Land and Finance Co., Ltd., of Buenos Aires, who recently visited this country. However, Australian methods of production would have to be improved before they reached

the standard of Argentina, he added. Mr. O'Dwyer, said that the quality of the beef cattle he had seen compared favourably with that of Argentina, and the proportion of good cattle in Queensland had surprised him.

Mr. O'Dwyer said that Australia's beef potential had hardly been touched. Watering facilities, fencing and transport were the main problems to be overcome. In Argentina beef production was near the optimum, as little country remained to be developed. With the possible exception of Brazil, a similar state of affairs had been reached in other South American countries. He did not think that conditions for beef production in South Africa were sufficiently attractive to expect a great increase in output from that country. A survey of the world position indicated that the greatest possibilities for beef production existed in Australia, and it was apparent that a market was available for every pound of beef that could be produced.

Gleanings

Holiday Harvesters: Every year, from April till November, about 100,000, men and women in Britain spend their annual holiday helping the farmers. Under the Government's "Lend a hand on the land" scheme they live in volunteer agricultural camps scattered throughout the country and do unskilled but vital jobs to ensure the harvest.

City and factory workers, students, housewives, and even visitors from overseas are attracted by this idea which was first tried in 1942. Farmers entrust their hoeing, weeding, planting, fruit picking and potato lifting to volunteers varying in age between 17 and 70.

On the "booking in" charts at the Ministry of Agriculture offices are names of people from Canada, from tea plantations in India, from farms in the Italian Alps and from the sheep-shearing tracts of Australia. This year 750 German students, and parties of other students from France and Scandinavian countries joined the campers to combine farm work with a vacation study of the British way of life. Three Australian girls used the scheme to work in three different parts of the country and see more of Britain.

Accommodation at the camps costs 35s. (Rs. 23/-) a week and pay is at least 1s. 6d. (Re. 1/-) an hour, except during October and November. Extra help is urgently needed then with the potato harvest and pay goes up to 1s 9d (Rs. 1—2—0) an hour while accommodation fees go down to 20s (Rs. 13—5—0) a week. About 15,000 volunteers help to lift Britain's potatoes.

Facilities for Recreation: Proof of the scheme's popularity is provided by the fact that every place in every camp up to the end of August was booked by July, and some workers go year after year to the same spot.

A 36–40 hour week is expected of these work-cum-holiday volunteers, amounting to about eight hours a day. In charge of the camps, which are usually hutted are wardens, who must see that their guests are entertained at the end of the day's toil. They supply packed lunches during the week, with a main meal in the evening, and arrange impromptu concerts, sing-songs, brains trusts and motor coach tours as part of the attractions. A camp may accommodate up to 100 people, and is equipped with modern washing, bedrooms or dormitories, radio and a recreation room for staging dances, cinema shows, table tennis matches and darts tournaments. If it were not for this yearly force of land volunteers, Britain's farmers would be at a loss to cope with their much-need crops. [British Information Service, B. F. 1814]

The banana skin has been referred to as "Nature's bacteria-proof wrapper". It has been found that the green banana skin and pulp contain anti-fungal substances, but ripe banana skin and pulp (naturally and ethylene-ripened) contain both anti-fungal and anti-bacterial substances. Our results indicate that antibiotics in the banana skin and pulp appear during the ripening process. Of particular significance is the fact that an anti-bacterial factor active towards acid-fast bacteria (Mycobacteria) does not appear until the banana is well ripened. An anti-fungal substance, which inhibits the growth of disease-causing fungi, has been separated from the antibacterial fractions.

It has been found that sweet potato vines which are sometimes used as silage, contain highly active antifungal and anti-bacterial substances. It is perhaps significant that the edible tuber also contains these substanees. From an active water-soluble resinous fraction, a buff-coloured, crystalline-appearing solid and a clear red brown liquid, with a distinctively characteristic odour have been obtained. The solid material exhibits selective activity towards the gram-negative bacteria (E. coli.) and the liquid toward gram positive bacteria (expecially Myco bacteria) and toward fungi.

Interest in the use of drugs to treat rheumatoid arthritis and related diseases is keen. The most pressing problem in 1950 was to produce Cortisone, Artisone and allied drugs in quantities large enough for the needs of arthritis patients. The drugs were first prepared from animal sources but those sources, it quickly became apparent, yielded too little to meet the demand. Turning to the plant kingdom scientists began an intensive search for plants that contain suitable anti-arthritic precursors. They have found that the sapogenins, a little known group of compounds are excellent precursors for anti-arthritic drugs. In plants the sapogenins are combind with Sugar. The combinations known as saponins are highly posionous. An acid treatment removes the sugar from the saponins afterwhich the non-poisonous sapogenin can be recovered. Some excellent sources of sapogenins have been found in the Yucca, agave and yam, which are native to Mexico and the S. W. States of the U. S. A. [Year-Book of Agriculture (U. S. D.) p. 732]

Hints to Farmers

Soil is perhaps the most important factor in Agriculture and crop production and hence a proper knowledge of the fertility status of the land is essential for any progress in Scientific agriculture. To assess this, soil samples have to be taken and tested by chemical analysis before launching any agricultural enterprise. The following are some of the points to be observed when such soil samples are drawn for analysis :—

1. Soil samples should be drawn as far as possible when the land is dry i. e., not when it is irrigated or under puddled conditions.

2. It should be drawn before any preparatory cultivation like ploughing manuring etc. is done.

3. Soil samples have to be drawn only when there is no crop on the land.

4. Weeds and other vegetation should be scraped off from the sampling spot without disturbing the surface soil. They may be best removed by hand first and the smaller plants removed by scrapers.

5. The depth of sampling should depend on the nature of crops usually grown on the soil and the variations in the soil profile, (i. e., the appearance of a freshly-cut vertical face of a pit dug in the soil) when they appear (1 ft. for shallow-rooted and 2'—3' for deep-rooted crops.)

6. To take a sample of a representative nature, collect the samples from different places in the area (say about a dozen) and mix them depth-war and draw a sub-sample to represent a sample of a particular depth. This will avoid the risk of choosing by mistake a poor or highly-fertile spot.

7. The Samples, if they happen to be moist, should be dried in the shade and then only despatched to be analysed.

8. As far as possible the labels inside the bag and outside the bag should give the serial number, treatment, depth, plot or field number and any other information regarding the same.

9. The samples which should be atleast 5 lb. in weight, should be packed in cloth bags (preferably thick cloth of a close mesh) to avoid the spilling of fine particles in transport. Gunny bags should not be used for directly packing the soils.

10. A covering letter should also be sent noting all details regarding the samples, if it is not given already on the label, like previous crop, manurial treatments, colour etc.

(C. R. V. & T. S. L.)

Weather Review — For December 1951

RAINFALL DATA

Division	Station	Total rainfall for the month	Departure from normal in inches	Total since 1st January in inches
Orissa & Circars	Gopalpur	0·0	—0·5	49·6
	Calingapatnam	0·0	—0·5	40·0
	Visakhapatnam	0 0	—0·6	42·4
	Araku Valley*	+	—1·1@	67 2
	Anakapalle*	0 0	—0·8	47·1
	Samalkot*	0·0	—0·3	36·6
	Kakinada	0·0	—0 7	45·2
	Maruteru*	0·2	—0·4	53 0
	Masulipatnam	0 0	—0·7	34·1
	Guntur*	0 0	—0·4	28·3
	Agri. College, Bapatla*	0·0	—1·2	26·6
	Agri. College FarmBapatla*	0·0	X	29·1
	Rentachintala	0·0	—0·1	18·6
Ceded Districts	Kurnool	0 0	—0·2	27·2
	Nandyal*	0·0	—0·2	23·1
	Hagari*	0·0	—0·3	21·1
	Siruguppa*	0 0	—0·1	19·0
	Bellary	0 0	—0·1	23·9
	Cuddapah	0·0	—0·8	20·2
	Kodur*	0·0	—4·9	22·1
Carnatic	Nellore	0·0	—2·9	22·6
	Buchireddipalem*	0·0	—3 3	20·7
	Madras (Meenambakkam)	0 1	—5·4	30·7
	Tirurkuppam*	0 0	—5 4@	27·1
	Palur*	0 0	—6·4	45·2
	Tindivanam*	0·1	—4·1	27·8
	Cuddalore	0·2	—7 3	54·7
Central	Vellore	0·0	—2 6	31 4
	Gudiyatham*	0 0	—2·2	25·5
	Salem	0·0	—1·0	29·9
	Coimbatore* (A. M. O.)	0·2	—1·2	19·3

Division	Station	Total rainfall for the month	Departure from normal in inches	Total since 1st January in inches
Central Contd.	Coimbatore	0·1	—1·4	24·2
	Tiruchirapalli	0·0	—2·6	32·0
South	Nagapattinam	1·9	—9·1	34·6
	Aduturai*	1·3	—2·9	29·6
	Pattukottai*	0·7	—2·1	26·3
	Madhurai	0·0	—2·0	37·2
	Pamban	6·5	—1·1	40·0
	Koilpatti*	0·6	—2·0	26·6
	Palayamcottai	0·2	—4·0	25 6
	Ambasamudram*	0 8	—5·4	37 8
West Coast	Trivandrum	0·6	—1·9	74·4
	Fort Cochin	0·0	—1·6	101 0
	Kozhikode	3·7	+2·2	105·1
	Pattambi*	0·6	—1·1	87·0
	Taliparamba*	0 4	—0·7	117·4
	Nileshwar*	0·1	—1·8	118·1
	Pilicode*	0·0	-1·9@	114·5
	Mangalore	0·0	—0·7	119·7
	Kankanadi*	0 0	—0·6	115·6
Mysore & Coorg.	Chitaldrug	0·0	—0·5	25 9
	Bangalore	0·0	—0 4	35·6
	Mysore	0·0	—0·4	31·5
	Mercara	0·0	--0·7	121·7
Hills	Kodaikanal	0·4	—4·7	73·1
	Coonoor*	1·5	—4 8	67 5
	Ootacamund*	0·0	—7·9	44·1
	Nanjanad*	0·9	—0·4	63·5

Note :—

1. * Meteorological Stations of the Madras Agricultural Department.
2. @ Average of nine year's data for Pilicode, and eight year's data for Tirurkuppam, and seven years' data for Arakuvalley is given as normal.
3. Average of ten years' data is taken as normal.
4. X The farm was started only this year.
5. + 1 to 4 cents of rainfall.

Weather Review for December, 1951

The trough of pressure which remained on the last day of November, 1951 moved away westwards on 1—12—1951. A well-marked low pressure wave was moving westwards across the South Andaman Sea on 2—2—1951. This accentuated the seasonal trough over the extreme South of the Bay of Bengal, which concentrated into a depression near about Lat. 8°N and Long. 91°E on 5—12—51, and intensified into a severe cyclonic storm two days later, near about 11°N and 88°E, while moving towards North West. Afterwards this changed its course towards NNE, maintained is severity for 5 days and rapidly weakened on 12—12—51, passed inland in the North-Easterly direction over Arakan-Chittagong Coast on 16—12—51, and became unimportant on the very next day over Central Burma. A low pressure wave commenced moving westwards across the Comorin area on 25—12—51 and passed away on 28—12—51. This induced scattered rains in coastal South Tamil Nad. On the very next day another low pressure wave moved into Comorin area across Ceylon. This moved away westwards across the Maldives on the next day.

A series of 11 Western disturbances passed over North West India during this month.

In general, the rainfall in December was below normal over the region especially in the Carnatic, the Southern districts, and the Hills.

Night temperature were generally bellow normal for 18 days and above normal for 9 days during the month. Ootacamund recorded the lowest temperature of 38 F. on 4—12—51, which was 7 F. below normal.

The particulars regarding noteworthy falls and zonal rainfall are furnished hereunder :—

Noteworthy Falls During the Month

S. No.	Date	Place	Rainfall in inches in past 24 hours.
1.	1—12—51	Kozhikode	3·6
2.	4—12—51	Minicoy	2·3
3.	26—12—51	Pamban	2·9

ZONAL RAINFALL

S. No.	Name of Zone	Actual Rainfall	Departure from normal	Remarks.
1.	Orissa and Circars	0·02″	— 0·56″	Below Normal
2.	Ceded Districts	0·00″	— 0·94″	Below Normal
3.	Carnatic	0·05″	— 5·12″	Far Below Normal
4.	Central	0·05″	— 1·83″	Below Normal
5.	South	1·50″	— 3·58″	Far Below Normal
6.	West Coast	0·60″	— 0·90″	Below Normal
7.	Mysore and Coorg	0·00″	— 0·50″	Below Normal
8.	Hills	0·70″	— 4·45″	Far Below Normal

Agricultural Meteorology Section,
Lawley Road P.O., Coimbatore.
Dated, 15th January, 1952.

M. B. V. N., C. B. M., & M. V. J.

Departmental Notifications

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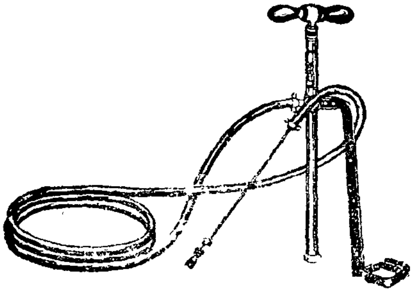

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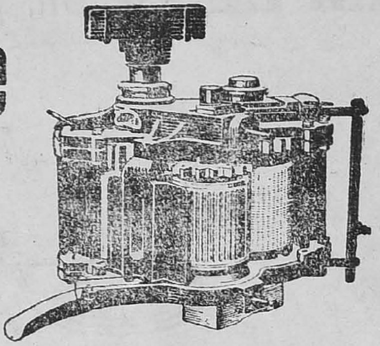

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